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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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NISKAYUNA, NY 12309

EXAMINER

TUROC, DAVID P

ART UNIT	PAPER NUMBER
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1762

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

DETAILED ACTION

Response to Amendment

1. Applicant's amendments filed 2/16/2007, have been fully considered and reviewed by the examiner. The examiner notes that claims 1, 3, and 17 have been amended, the cancellation of claims 25-26, and the addition of new claims 27-28. In view of the amendment, the examiner has withdrawn the 35 USC 112 1st paragraph rejections. Currently, claims 1-24 and 27-28 are pending in this application.

Response to Arguments

2. Applicant's arguments filed 2/8/06 have been fully considered but they are not persuasive.

Applicant argues against the Bunker reference, stating the reference fails to disclose the flow director (slot) fails to extend radially from the surface of the wall. The examiner respectfully disagrees. The layer arrangement on the wall as taught by Bunker does extend into the hot gas flow path and extends radially from the surface, thereby forming a slot. Therefore the walls of the coating layers are in fact the flow directors which do in fact extend from the internal wall.

All other arguments are directed to newly added limitations that will be addressed in the rejections to follow.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-24 and 27-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 requires the flow director does not extend over the exit site of the film cooling hole, however, the examiner after a review of the original disclose can not locate proper support in the specification for such a negative limitation. Negative limitations recited to overcome prior art can be considered new matter. *Ex Parte Grasselli et al.* 231 USPQ 393.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim requires the flow director to:

1. extend through the hot gas flow path,
2. not extend through the exit site of the cooling hole, and
3. being formed on the passage wall cooling hole.

However it is unclear how such a situation can occur. For the purposes of applying art the examiner will interpret the flow director to be positioned as shown in

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figure 14 because such is the support in the disclosure for the limitation set forth in claim 28.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5, 10-20, 23, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bunker et al. (US Patent No. 6,234,755).

Claim 1, Bunker et al. discloses a method for forming a flow director (by forming a slot over the holes) on a component comprising a wall, depositing at least one layer on the wall of the component wherein the deposition includes shaping the layer(s) in accordance with the predetermined shape of the slots and therefore forming the flow director (wall of slot) the formed layer extends radially (~90° from wall) outwards from the initial wall of the component and into a hot gas flow path (65) (column 2 lines 20-24, lines 50-60; figure 3). Bunker et al. discloses the coolant is directed from the film-cooling hole towards the hot surface of the wall, see arrows of coolant flow in figure 3.

(Figure 3, Column 4, lines 15-22). The flow director (wall of slot) fails to extend over the exit site of the film cooling hole that extends through the wall (see figures).

Claim 2, Bunker et al. discloses that the deposition comprises depositing a plurality of layers (column 2 lines 61-67) and shaping the layers using a mask to form the flow director, the slot (column 2 lines 50-60).

Claim 3, Bunker et al. discloses the wall has a cold surface and a hot surface (column 4 lines 15-20) with holes extending through the wall for flowing a coolant from the cold surface to the hot surface, and the deposition comprises depositing the layer(s) on the hot surface wall (column 4 lines 5-30, column 5 lines 47-67).

Claim 4, the flow director (the slot) comprises a method of directing the coolant flowing out of the exit site and towards the hot surface of the wall (column 2 lines 13-24) thus the coating acts to form the slot and modifies the flow of the coolant gas.

Claim 5, the flow director comprises a ridge extending along at least a portion of the exit site and further extending to a position downstream of the exit site (figure 4).

Claim 10, the deposition can be more than one layer thus it is formed a plurality of times (column 2 lines 61-67) and is done on more than one hole thus it is formed on a plurality of positions and forms a plurality of flow directors on the wall of the component (column 4 lines 63-54).

Claims 11, 12 and 13 one layer can comprise a metal while another layer comprises a ceramic (column 2 lines 61-67).

Claim 14, the component can comprise a secondary coolant slot (figure 6) in the substrate and this is enhanced by the flow director (the film on top of the slot) as this

film makes the slot have a deeper depth and thus enhances the secondary coolant flow (column 9 lines 59-67).

Claim 15 the deposition can be done using CVD or PVD (column 5 lines 47-67).

Claim 16, Bunker et al. discloses that there is a masking step (column 2 lines 50-60).

Claim 17, all the features of this claim have been discussed above except that the part is a turbine component, which is disclosed in column 2 lines 13-24.

Claim 18, Bunker et al. discloses forming a plurality of layers on the wall and shaping the layers in a predetermined shape to form the flow director (column 2 lines 50-60).

Claims 19, 20 and 23 these claims have been described previously above.

Claim 24, Bunker et al. discloses that the protective coating is formed on the hot gas path surface of the component (column 2 lines 40-45).

Claim 27, the wall has four sides and can broadly be classified as a polygonal.

9. Claims 1-5, 27 and 28 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Haselbach (US Patent No. 6,817,833).

Haselbach discloses a method for forming a flow director on a wall and a cooling hole with a layer formed on the passage wall of the hole (Figures). The flow director is configured to spread the coolant flowing from the hole and out the exit site laterally (Figures). Haselbach discloses forming multiple flow directors, i.e. depositing multiple layers, on the hot surface of the wall (Column 3, lines 9-10). In a situation where no

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coolant is supplied, the flow director can be considered to be through a hot gas flow path.

Claim 27 – Haselbach discloses forming a rounded flow director (Figures, column 3, lines 10-15).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 6-9, 21 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Bunker et al. in view of Sabol et al. (US Patent No. 6,060,174).

Claims 6 and 21, Bunker et al. discloses all of the features of the claims as discussed above except it does not disclose delivering a mixture through a nozzle onto the wall to form the layer wherein the mixture comprises a powder dispersed in a liquid medium. However, Sabol et al. teaches that when applying a MCrAlY film it can be applied as a powder slurry in a liquid medium using a slurry spray and that this technique is less expensive (column 3 lines 11-49). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bunker et al. to use a slurry spray to apply the MCrAlY coating as suggested by Sabol et al. as this method is less expensive.

Claims 7 and 22, the part is a turbine engine part and the layer will be heated upon use of the part.

Claim 8, the nozzle must be displaced relative to the wall in order to spray coat the entire surface this would be done in accordance with the shape of the wall.

Claim 9, the spraying would obviously be controlled so that the wall is coated and not other parts that are not supposed to be coated this would be done in accordance with the shape of the wall.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 6,881,439.

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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David Turocy
AU 1762

A handwritten signature in black ink, appearing to read 'T. Meeks', is written over the printed name and title.

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER